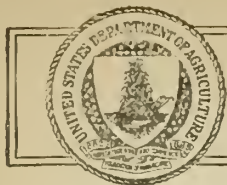


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U. S. DEPARTMENT OF AGRICULTURE
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WASHINGTON, D. C.

RELEASE FOR PUBLICATION
JULY 1, 1936 (WEDNESDAY)

THE MARKET BASKET

by

Bureau of Home Economics, U. S. Department of Agriculture

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CANNING -- ESPECIALLY CORN

By the Fourth of July, "roastin' ears" from the home corn patch. That is the ambition of home gardeners north of the "early states" where corn, thanks to the warmer climate, has been coming along now for several weeks. And as home-grown corn becomes more plentiful, home canners are busier. They have been busy, of course, ever since the spring and summer fruits came on.

Canning corn, however, is not as easy as canning fruits. Like other vegetables except tomatoes, corn, after it is in the cans or jars, should be "processed" in a pressure canner, to make sure it will not spoil. But even then, cream-style corn is hard to can successfully, especially in glass jars, and the Bureau of Home Economics of the U. S. Department of Agriculture suggests canning corn whole-grain style instead.

The essential difference between the two methods is in the way the corn is cut off the cob. For cream-style corn, the top of the kernels is cut off and the rest is scraped, making a thick, starchy mass which packs densely into the can. Heat penetrates slowly through such a mass, and often the corn at the center does not get hot enough to kill the bacteria that cause spoilage. To process cream-style corn properly requires, for No. 2 cans, 15 pounds steam pressure, or a



REPUBLIC OF THE PHILIPPINES
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1907

temperature of 250 degrees Fahrenheit in the pressure canner for 70 minutes. For cream-style corn in glass jars, which are harder to heat than tin, more time is needed, and the corn sometimes turns brown. This does not affect the wholesomeness of the corn, but it does affect the looks and often the flavor.

For whole-grain corn, cut the kernels off just as close to the cob as possible without getting the hulls. Do not scrape the cob. Add one teaspoon of salt to each quart of corn, and half as much boiling water as corn by weight. Heat to boiling and pack into the cans boiling hot. Put the cans into the steam pressure canner at once, and process them at 10 pounds pressure or 240 degrees Fahrenheit -- 50 minutes for No. 2 cans (C enamel or plain tin), and 60 minutes for pint glass jars. In this time the whole-grain corn heats up properly all through and chances of spoilage are much less than with cream-style corn.

Another difference between the cream-style and whole-grain style corn is the age of the corn for canning. For whole-grain style use only tender, freshly gathered sweet corn, 3 or 4 days younger than would be used for cream-style corn.

The whole purpose of canning any food, of course, is to keep it from spoiling, and so enable us to provide the perishable foods for use after the time when they can be had fresh. The canning process does this by eliminating the two main causes of spoilage. Over-ripening is one cause in fruits and in vegetables. Another cause is the action of bacteria, molds or yeasts that are on or in the fruit or vegetable, and everywhere in the air about them. Canning puts a stop to ripening, destroys the organisms of spoilage on or in the food, and seals the product away, airtight, so that no more of these organisms can enter.

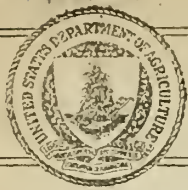
Whatever the fruit or vegetable, then, the first step in canning is to make sure, it is just ripe enough to be at its best and not so ripe that it is on the road to decay; that is to clean and free from any spots or blemishes;

and that every hand that touches it, every knife or spoon, cup, pan or kettle, can or jar used in preparing the food or canning it, is clean. With such precautions, all unnecessary causes of spoilage are ruled out, and we go on the more successfully from there.

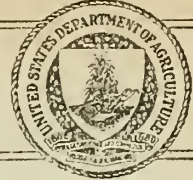
When the food is ready to can, the next thing to do is to kill the bacteria and other organisms of spoilage not already disposed of, and for this we use heat. Most of these organisms can not live long in a temperature of 212 degrees Fahrenheit--that is, boiling temperature. Usually the food is heated before it goes into the cans, and always it is heated afterwards--"processed", we say, after the cans are filled, by keeping them in boiling water or in a steam pressure canner for a specified length of time, to make sure they are heated at least to boiling temperature all through.

At this stage of the process, temperature is the most important factor. For fruits and tomatoes, boiling temperature is sufficient, because the spoilage organisms are more easily killed in acid foods than in others. So the rule is: Process fruits and tomatoes in a boiling-water bath--a big pan or a wash boiler with a rack inside to hold the cans in place while water boils around and over them for the proper length of time to kill the spoilage organisms--from 5 to 15 or 20 to 45 minutes, according to the kind of fruit, the amount of cooking it has had, and the size of the can.

But process corn and all other vegetables except tomatoes and pimientos, in a pressure canner, at the specified temperature and for the specified time for each kind of food. For temperature control the large canners are best--18 quart capacity or more.



U. S. DEPARTMENT OF AGRICULTURE
Office of Information
Press Service



WASHINGTON, D. C.

RELEASE FOR PUBLICATION
JULY 8, 1936 (WEDNESDAY)

THE MARKET BASKET

by

Bureau of Home Economics, U. S. Department of Agriculture

COOKING SUMMER VEGETABLES

At this time of year there is every reason for doing as little cooking as possible. Not only to keep cool and save fuel does the housekeeper avoid the stove as much as she can, but the summer fruits and many of the vegetables encourage her to do so. The season's crop of berries, cherries, plums, peaches, melons, and pears are an invitation to use these luscious fresh fruits for desserts, while the radishes, lettuce, onions, celery, cucumbers, tomatoes and many other of the garden's choice products speak up, as it were, for a place on the salad plate.

But there are always some vegetables to cook, of course--asparagus, beets, beans, peas, chard, cauliflower, kohlrabi, okra, eggplant, kale, beet tops and mustard are some we do not use uncooked, while cabbage, carrots, celery, and some of the greens are used both raw and cooked. A good summertime dinner will offer as a rule two or three cooked vegetables. And, says the Bureau of Home Economics of the U. S. Department of Agriculture, vegetables can be cooked in such a way as to retain their characteristic flavor, attractiveness, and food value, or they can be cooked to a common level of tastelessness, with much of their food value gone. The cook must know how to do it right.

Boiling is the most common as well as, for many vegetables, the favorite method of cooking them. Taken off the stove when just tender, and served hot

with melted butter or other fat, salt and pepper, such vegetables as asparagus, new potatoes, beans, peas, cabbage, greens, carrots, okra and parsnips are at their best this way. But "creaming" is another favorite way to serve almost any vegetable. "Creamed" vegetables are boiled first and then combined with white sauce.

The most important factors here are cooking time and the quantity of water contained in or added to the vegetable. With tender cabbage and the greens, no water except what clings to the leaves after washing, plus the water in the leaves themselves, is necessary or desirable, because the object is to have no more liquid after cooking than will be served as juice in the dish with the vegetables. This juice should be served because in it are dissolved important food values which should not be lost. And the cooking time should be too short to permit much "cooking down".

Root vegetables need a longer cooking time than cabbage and greens. And they are cooked in more water--though not too much. Most of them contain a good deal of starch. Onions, with little starch, have a tough skin on each layer or ring. Beets are fibrous and solid, and need more cooking time than the green vegetables. Potatoes need more time partly because of their size, partly because there is so much starch to cook.

When it comes to peas and lima beans, which are shelled for cooking, again more time is needed because the outer coat of the seed needs softening, and most people do not like a raw taste in the starch of the kernel. This is true also of corn, whether cooked on the cob or cut off. Water is added in cooking these vegetables, of course, but again, not too much, though cooking corn on the cob is an exception to this rule because its juice does not escape and plenty of water is needed to heat the corn thoroughly.

Baking retains more of the food value and flavor than other methods of cooking, and is used especially for potatoes, squash, cucumbers, tomatoes, and onions. These vegetables contain enough water to form steam and keep the

vegetable moist, and the skin holds in this steam. For these and other vegetables, however, a baking dish with a close-fitting lid serves much the same purpose as the skin. In this case the cover should be removed at the end of the cooking period to let the last of the steam evaporate and allow the vegetable to brown a little. A moderate oven is best for baking most vegetables, either in the skin or in a baking dish.

So far as retaining food value is concerned, steaming is next best to baking, and is a good way to cook carrots, squash, beets, parsnips, sweetpotatoes, wax beans and many others--but not green leafy vegetables as a rule. Nor should any fresh vegetable be cooked in a pressure cooker, because this method destroys vitamin values and causes undesirable changes in color, flavor, and texture.

Panning is one of the best ways to cook cabbage, kale and various other greens. The vegetable is cut in small pieces and cooked in a flat, covered pan on top of the stove, with a little fat in the pan to prevent sticking. The water that cooks out of the vegetable in this case evaporates, so there is little or no liquid to be served. If the panning is carefully done, it is possible to add some milk without having the cooked vegetable too moist, and the finished product will then contain all the food value and flavor of the vegetable as well as of the milk.

Keeping the color in vegetables is one of the problems the cook has to deal with, especially in green vegetables and in certain red ones. That is why the Bureau of Home Economics advises cooking green vegetables with the lid off. The reason for the change in the color is the acid in the vegetable which is released by the cooking, and the lid holds the acid vapor close to the vegetable. With the lid off, some of the acids evaporate and go off in the air, so that cooking for a short time does not cause much change in color. Neutralizing the acid by putting soda in the cooking water is another method of keeping the green color,

but soda destroys vitamin values in the vegetable and is not recommended by the Bureau of Home Economics.

The red color in beets and red cabbage (but not tomatoes), is the kind that turns blue in the presence of an alkali--such as soda, or cooking water that is hard. Acid keeps the red color in these vegetables, so vinegar is added to the cooking water to keep red cabbage and red onions red. Beets contain enough acid to keep them red, but they may lose color by "bleeding"--that is, the dissolving of the coloring matter in the cooking water. They should be cooked with the skins unbroken, and with at least little stubs of the tops left on. Young beets are often cooked and served with two or three inches of the tops left on.

White vegetables stay white if cooked in soft or fairly soft water. But in very hard water, or with too long cooking, they turn yellow from alkali in the water. Cooks have seen this happen with white onions, cauliflower, or the white parts of cabbage. Usually the yellow color is not objectionable, but if the water is very hard a little cream of tartar or vinegar may be added to preserve the whiteness.

The really "fast color" vegetables are the yellow ones. Carrots, sweet-potatoes, and yellow squash keep their color however cooked. So do such red vegetables, as tomatoes, red peppers and pimientos, which are in fact colored by pigments belonging to the same class as those found in carrots--called carotinoids.



U. S. DEPARTMENT OF AGRICULTURE
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JULY 15, 1936 (WEDNESDAY)

THE MARKET BASKET

by

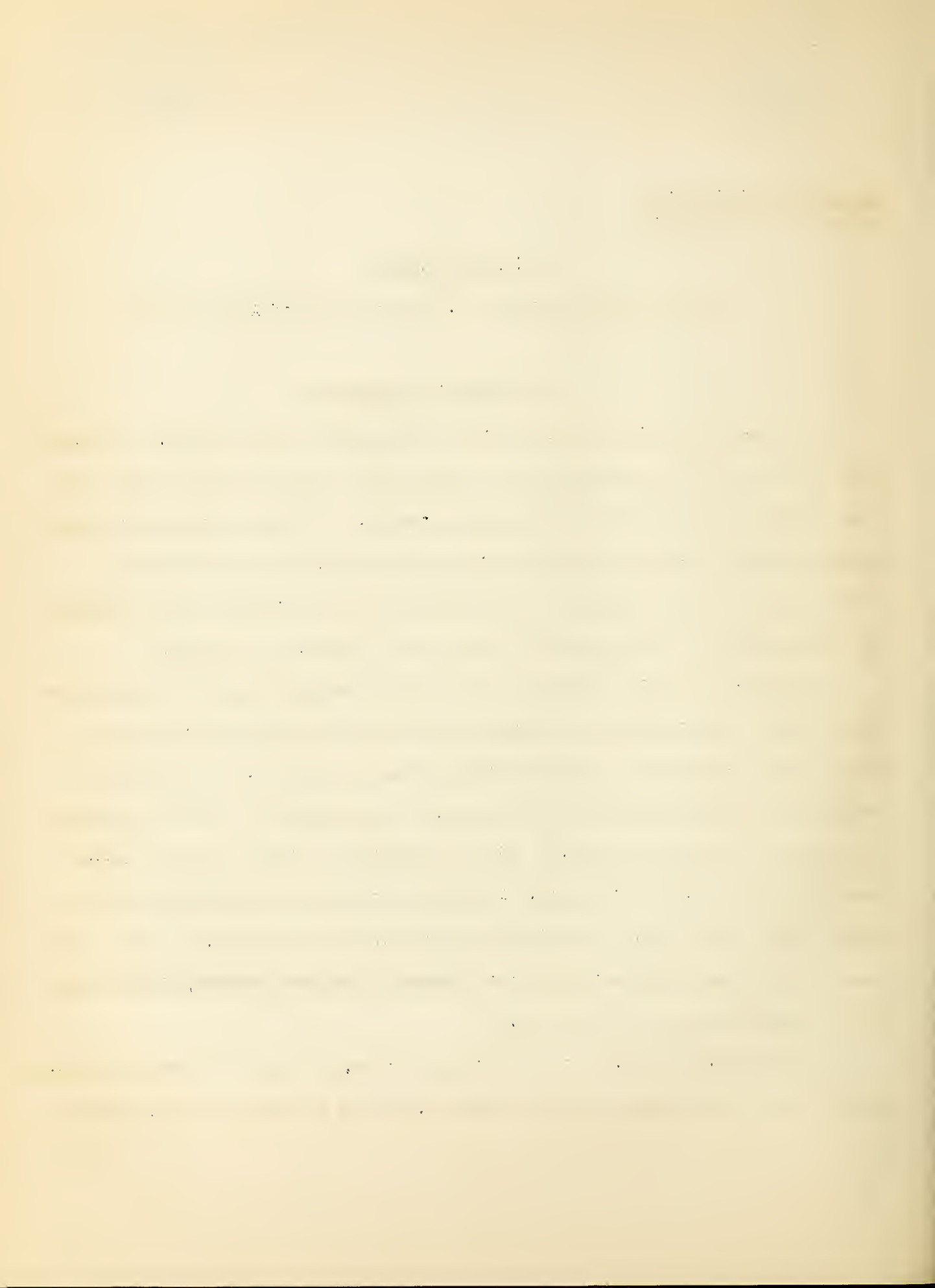
Bureau of Home Economics, U. S. Department of Agriculture

HOT BREADS IN SUMMERTIME

Hot weather does not usually destroy the appetite for hot breads. Although a hot oven is hard on the cook when the weather also is hot, the oven heated for other purposes may as well be utilized for bread too. With a gas oven that heats quickly, or with an electric or any other insulated oven, the 10 or 15 or 20 minutes needed to bake biscuits, rolls or muffins does not count heavily against the attractiveness of hot bread with a cold plate luncheon, for example.

And bread, which is always one of the chief energy foods, may very well be the one food in that class on a summer menu, with an extra green vegetable or a fruit served in place of a starchy vegetable every now and then. Especially if the bread is mixed and baked for the occasion, it may easily be used to round out the nutritive content of the meal. Rolls or biscuit are often made with milk--sweet milk, sour milk, or buttermilk. Muffins and other batterbreads as a rule contain both milk and eggs, furnishing these additional food values. A meal with meat, eggs or fish, green vegetables or tomatoes, biscuits or muffins, fruit and milk has all the kinds of food we need.

Bread making, however, in the bakery or at home, is one of the practical applications of very complex scientific knowledge, says the Bureau of Home Economics



of the U. S. Department of Agriculture. In commercial bakeries, chemists are on the job to see that the bread formulas and procedure are just right to produce the loaf desired. The home breadmaker is not often a chemist, but if she makes good bread she applies scientific principles, whether she calls them that or not.

All breads are made with flour or meal of some sort, but the breadmaker describes the two main classes of bread by the kind of leavening she uses. She speaks of "yeast breads" and "quick breads". Yeast breads, however, are always wheat or rye breads, as it happens, because wheat and rye flours are the only kinds with which yeast can be used. Quick breads, on the other hand, may be made with any kind of flour or meal, but they are made with quick-acting leavening agents, such as baking powder, or soda and sour milk. Yeast breads take longer to rise, quick breads are so-called because they rise at once.

Despite the slow-rising of yeast breads, however, there is a way to provide hot rolls at any meal without much trouble, and only 15 or 20 minutes in the oven. These are called "refrigerator rolls". The trick is, by chilling, to manage the yeast and the proteins in the bread mixture in such a way as to meet the cook's convenience.

The yeast cake is composed of a living fungus, a form of plant life which grows when moist and warm and when it has food, as in the bread mixture. Yeast causes fermentation as it grows. Fermentation in the dough forms gas which must find room in the dough. Wheat or rye bread mixtures hold this gas and expand as it forms, because the proteins in these flours are elastic and strong. Kneading develops the proteins, especially two wheat proteins which combine to form "gluten", and makes them more elastic as the gas bubbles multiply, until the dough expands to twice its original bulk or more. Then baking "sets" the protein and the result is the fine-celled structure of wheat bread.

Reckoning with the behavior of both the yeast and the wheat proteins, the directions for refrigerator rolls are: Soften a cake of compressed yeast in $1/4$ cup of lukewarm water. Add $1/2$ cup of fat and $1/2$ cup of sugar to 2 cups of scalded milk, then cool and add these to 1 beaten egg. Combine with the yeast and water. Stir in 8 cups of sifted soft-wheat flour and $1-1/2$ teaspoons of salt until the dough is stiff enough to knead. Toss on a floured board and knead from 10 to 15 minutes or until the dough is smooth and elastic. Put the dough in a greased bowl, grease the surface of the dough and keep in a warm place until doubled in bulk. Turn out on to the board, knead, grease the surface of the dough again, cover and put in the refrigerator.

Next day, when ready to use the rolls, cut off the amount of dough required, shape it into rolls, in the baking pan, put them in a warm place and let them rise to double their bulk. Then bake from 15 to 20 minutes in a hot oven (400 degrees Fahrenheit). The remaining dough will keep in the refrigerator for 3 or 4 days, or even a week. Less sugar may be used, but the dough loses sweetness when kept over.

Quick breads include biscuits and all the batterbreads, with their many variations. And those variations are often due to the kind of flour or meal and to the leavening agent. Wherever wheat flour is used, whether white or whole-wheat, the texture of the bread is affected by the amount of kneading or stirring. For drop biscuits, the ingredients are barely mixed in a dough soft enough to drop from a spoon. For a flat rolled biscuit, a stiffer dough and just a few strokes of kneading. For a tall, flaky biscuit, about 18 strokes. Wheat muffin mixtures should be stirred only enough to mix and moisten all the ingredients. More stirring makes muffins with tunnels inside and irregular peaks on top or over the side of the muffin pan. As leavening, soda and sour milk may be substituted for baking powder--a scant half teaspoon of soda for each cup of sour milk, which replaces sweet milk.

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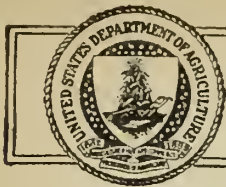
26. In the twenty-sixth part, we consider the case of a system of particles and continuous media.

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In corn meal there is no gluten as in wheat flour. The proteins there will not hold leavening unless reinforced with stronger, elastic proteins, such as are found in eggs, or in wheat flour. Corn dodgers, hoe cakes, ash cakes and other plain meal-and-water corn breads are unleavened. The mixture would not hold a leavening. The leavened corn breads all contain eggs or wheat flour or both, partly because of the need for the egg or wheat proteins to hold the gas released when the baking powder, or the soda and sour milk, react in the batter. Eggs, of course, add both flavor and food value to corn breads. Spoon bread, the softest, usually is also the richest in fat as well as in eggs.

But since it is important to keep down the oven time in summer, the breads that bake most rapidly are the best choice for comfort in the kitchen. Biscuits need only 10 or 12 minutes. Yeast rolls, wheat muffins, corn muffins need 15 or 20 minutes. Loaf breads or thick layers of corn bread need more time. With electric cooking equipment on the table, griddle cakes or waffles can, of course, be served without the discomfort of a hot stove or a hot kitchen at any time.



U. S. DEPARTMENT OF AGRICULTURE
Office of Information
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WASHINGTON, D. C.

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JULY 22, 1936 (WEDNESDAY)

THE MARKET BASKET

by

Bureau of Home Economics, U. S. Department of Agriculture

SUMMER CAKES AND COOKIES

Cookies, plain cup cakes and individual sponge cakes are the cakes for summer time, suggests the Bureau of Home Economics of the U. S. Department of Agriculture, and there are two reasons why. First from the cook's standpoint is the fact that they are easy to make. And most people will agree that they make an agreeable combination with fresh summer fruits for dessert.

Cookies belong to the large class of cakes made with fat, as distinguished from sponge cakes, which are made without fat. Plain cup cake, foundation cake, rich cake, pound cake, and all the variations of these basic recipes, from white cake to devil's food and including cookies, are made with fat. The other essential ingredients are flour, liquid, sugar, eggs, a leavening agent, and flavoring. For cakes, soft-wheat flour is better than hard-wheat flour; milk is the best liquid in most cases; granulated sugar is preferred to powdered; a fat which can be creamed is better than an oil. Pound cake has no leavening, but the other cakes of this class are leavened usually with baking powder, or soda and sour milk. Cookies as a rule are a modification of foundation cake and rich cake.

The main difference between cookies and cakes, excepting their size and form, is that cookies are made from dough and cakes from batter. But that, of course, is only another way of saying that cookies contain more flour and less liquid than cakes.

Drop Cookies

There are, however, soft-dough or drop cookies, and stiff-dough or crisp cookies. The dough for drop cookies, by one good recipe, is made with $\frac{3}{4}$ cup of fat to $1\frac{1}{2}$ cups of finely granulated sugar, 2 eggs, $\frac{3}{4}$ cup of milk, 4 cups of sifted soft-wheat flour, 4 teaspoons of baking powder, $\frac{1}{2}$ teaspoon of salt, 3 teaspoons of flavoring. These are about the same proportions used for foundation cake, except the liquid, of which there is considerably less, thus making the drop cookie mixture stiffer than cake batter, though soft enough to drop from a spoon.

The directions for mixing the drop cookie dough are: Cream the fat until it is soft, add the flavoring and the sugar gradually, stirring until the mixture becomes light and fluffy because of the air beaten into it. Continue the creaming while adding the well-beaten egg yolks, but add them slowly, otherwise the mixture may curdle as the yolks go in. Sift the dry ingredients together, then add them and the liquid alternately to the fat and sugar mixture. The dry ingredients, however, should be beaten in, the liquid stirred in, and the dry ingredients should be the first and the last added. Last of all, fold in the beaten egg whites. Drop small portions of the dough from a spoon to a greased baking sheet or shallow pan, and bake for 15 minutes in a moderately hot oven (375 degrees Fahrenheit).

Orange drop cookies are a particularly attractive variation. To make them, use in place of the liquid (the milk and the flavoring) in the above recipe, 4 tablespoons of grated orange rind and $\frac{1}{2}$ cup of orange juice.

Refrigerator (crisp) Cookies

Crisp cookies, which are richer than drop cookies, are made from a stiff dough which is rolled thin, cut and baked in a moderately hot oven (375 to 400 degrees F.). Or the dough is molded into a roll, wrapped in waxed paper and put

in the refrigerator, sliced off thin and baked when desired. It takes but 10 minutes to bake these cookies.

Pin-wheel cookies are of this kind--made with a layer of vanilla-flavored dough, and a similar layer of chocolate-flavored dough, the two layers rolled up together like a jelly roll, chilled in the refrigerator, then sliced very thin and baked in a moderate oven. In this richer and also sweeter dough, the proportions are 1 cup of fat, 2 cups of sugar, 2 eggs, $1/4$ cup of milk or less, 4 cups of sifted soft-wheat flour, 4 teaspoons of baking powder, $1/2$ teaspoon of salt, 2 teaspoons of flavoring. Mix according to directions for drop cookies. For the chocolate layer, add 2 squares of melted chocolate (unsweetened) to $1/2$ the dough.

Sand tarts, one of the crispest kind of cookies, are made by omitting the liquid from the above recipe, substituting brown sugar for white, and using a little less of it ($1\ 1/2$ cups of brown sugar). This dough also is shaped into a roll, chilled in the refrigerator and sliced wafer-thin with a sharp knife, sprinkled with cinnamon and sugar (2 teaspoons of cinnamon to 6 tablespoons of granulated sugar). With a nut (a blanched almond or a pecan kernel) pressed into the top of each cookies, they are baked for about 10 minutes in a moderate oven.

Hot Cup Cakes

Plain cup cakes are the simplest and least rich of the cakes that are made with fat, which is another reason why they are good in summer time. These cakes are made from what is really just a rich muffin batter sweetened: $1/4$ cup of fat, 1 cup of sugar, 3 cups of flour, 1 egg, and 1 cup of liquid, with 4 teaspoons baking powder, $1/4$ to $1/2$ teaspoon salt, $1/2$ to 1 teaspoon flavoring. And this batter is mixed as simply as muffin batter -- i. e., melt the fat and mix it with the liquid and the egg. Sift the dry ingredients together, combine them with the other mixture, and stir until all ingredients are smoothly blended.

Because these cakes are easy to make and contain so little fat, they are

often served hot, and they go well with fruit or other desserts. Or the batter may be baked in a layer, split to hold a filling of custard or cream and served as Washington pie or Boston cream pie. Or, again, with a filling of sliced fresh peaches or other fruit, this batter makes a good shortcake. For cup cakes, blueberries, dried fruit, or nuts are often mixed in the batter.

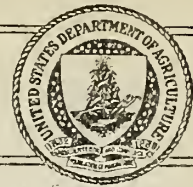
Sponge Cakes

The sponge cakes -- plain sponge, sunshine cake, and angel food -- contain no fat. They are, essentially, beaten eggs sweetened, flavored, and combined with flour. They depend on the eggs to hold the air which is their only leavening, so the proportion of eggs is high. For plain sponge cake: 4 or 5 eggs, 1 cup of finely granulated sugar, 1 cup of sifted soft-wheat flour, 2 tablespoons of lemon juice, 1 teaspoon of grated lemon rind, half a teaspoon of salt. Separate the egg yolks and whites, beat the yolks, beat in the sugar, lemon juice and rind, then the flour, sifted with half the salt. Add the rest of the salt to the egg whites, beat stiff, and fold into the mixture. A sponge cake should bake slowly because it contains so many eggs, and the oven temperature should be very moderate (325 degrees F.). When the cake is taken out of the oven, turn the pan upside down on a rack and let the cake drop out itself when it is cool, without any handling. Do not cut sponge cake. Break, or pull it apart with forks.

To shorten the baking time, sponge cake, as well as plain cake, may be baked in muffin tins as individual cakes. This will mean perhaps 20 to 30 minutes in the oven, depending on the size of the tins. And these cakes also may be split (with a fork) and filled with fruit or cream, shortcake fashion.



U. S. DEPARTMENT OF AGRICULTURE
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WASHINGTON, D. C.

RELEASE FOR PUBLICATION
JULY 29, 1936 (WEDNESDAY)

THE MARKET BASKET

by

Bureau of Home Economics, U. S. Department of Agriculture

SUMMER PASTRIES

Now is the time for home-grown fruits--therefore for pies and tarts and shortcakes made with such home-grown fruits as berries, cherries, peaches, plums and, a little later, grapes. These pastries, to the cook, constitute a little family of desserts which have their close resemblances, likewise their variations. Fruit pies are typically two-crust, or covered pies. But deep-dish pies have only one crust, which is over the top. Open pies and tarts have only one crust, which in this case is the bottom. Shortcakes are baked in layers, which are split apart and filled with fruit between. Simple enough to define, but each in the making calls for its own procedure and a special skill.

All pastries, in fact, says the Bureau of Home Economics of the U. S. Department of Agriculture, are a challenge to the skill of the cook. Nothing that comes out of the oven can be more disappointing than a tough or soggy pie crust or a heavy shortcake. Nothing that comes to the table is more enthusiastically welcomed than good pastry.

For pies and tarts we use the same kind of dough--stiff pastry dough. For shortcake, we use, as a rule, soft biscuit dough. The main differences between the doughs are their proportions of fat and liquid. But in gauging those differences and manipulating the dough lie the possibilities of success or failure

with the final product. So also for fruit pie, the baking procedure may determine whether the bottom crust shall be crisp and tender, or heavy and soggy with fruit juice. Here are some tried and proved directions to guide the novice.

Pastry Dough

Use an all-purpose flour, says the Bureau of Home Economics--flour which is a blend of hard and soft-wheat flours. And for a flaky crust use lard or some other solid fat, like hydrogenated cotton seed oil or other vegetable fat. Pastry dough is "short" and stiff. The proportions are 5 or 6 tablespoons of fat and only about 2 1/2 tablespoons of water to 1 1/2 cups of sifted flour and 1 teaspoon of salt.

The solid fat is "cut into" the flour until the mixture is crumbly and a little like coarse corn meal. Use a biscuit cutter for this, especially in warm weather, in preference to the fingers. To work the fat in with the fingers, however, use only the finger tips, have the fat cold and the room cool, and work quickly so the warmth of the fingers will not soften the fat too much.

The quantity of water is very important. If there is too much, the dough must be manipulated so much, to shape it and roll it out, that the gluten in the flour develops to a point of stickiness and the crust when baked will be tough. With too little water the crust is crumbly. With just enough water, it is tender and flaky. The method of adding water also is important. Sprinkle it evenly into the mixture of flour and fat. Use cold water to keep from melting the fat.

Deep-dish Pies and Tarts

Easiest and quickest to make are the deep-dish pies and the tarts. This is something for the cook to remember on a hot day because it means, for one thing, about half as much oven time as the regular two-crust fruit pies require.

Deep-dish pies are made, of course, in a deep pie pan or dish, or in individual casserole dishes. The fruit is put in first, sweetened, dotted with butter, and sprinkled with a bit of salt. Then a layer of pastry dough, rolled



thin and slashed with a knife or pricked with a fork to make openings for escape of steam, is laid over the top and pressed down over the edge of the dish. Bake in a moderately hot oven (375 to 400 degrees Fahrenheit). What we call a deep-dish pie is really what the English call a tart--their famous plum tart is made this way.

For tarts American style and individual size, the shells are most conveniently made on muffin tins turned upside down. Roll the pastry thin and shape it over the tins, folding and pressing back the edge of dough around the top to strengthen it and prevent breaking when the shell is removed from the tin after baking. Bake in a moderately hot oven (400 degrees F.) for about 10 minutes, or until the crust is delicately browned. Fill the tart shells with fruit--fresh, crushed, sliced, or canned fruit or jam.

Two-crust Pies

Fruit pies, unlike tarts, are usually two-crust or covered pies. And as most of the favorite pie fruits are very juicy, the bottom crust may easily get soggy while the pie is baking. Here is a problem not encountered either in the deep-dish pies, which have no bottom crust, or in the tarts, for which the shell is baked before the fruit goes in.

To prevent sogginess in the bottom crust of a fruit pie, there are two ways to proceed. The old-fashioned way, and still the most common way, perhaps, is to line the pie pan with pastry, put in the filling, put on the cover of dough, and bake for 10 minutes in an oven hot enough (about 400 degrees F.) to partially cook the bottom crust before the juice soaks into it. Then lower the oven to moderate heat (about 350° F.) and leave the pie to brown nicely and the fruit inside to cook. This may take another 30 to 35 minutes at the lower temperature.

Other pie makers advise baking the bottom shell before putting in the filling, just as for tarts, and then thickening the fruit juice before putting it into the shell. (This applies to juicy fruits only, not to apples, for example.) Do not brown the shell. Have it just lightly baked and crisp. Then heat the fruit a little, to make the juice flow, and strain off the juice. Add to the juice ever so little corn starch, flour, or tapioca, well mixed with sugar, cooking until the mixture thickens, then stir in the fruit itself. Put this filling into the baked pastry shell, moisten the rim, cover with the top layer of dough, which is a little larger than the under crust and is slashed a little or pricked with a fork to make openings for steam to escape as the pie cooks. Press the edges of the dough together and turn the edge of the larger, upper one under the other.

Bake the pie in a moderately hot oven (375 to 400 degrees F.)--not so hot as if crusts and filling were all to cook at once, starting cold. The filling in this case is already hot and the bottom crust is already partly baked. Besides, a hot oven would make the fruit boil over and spoil the looks of the pie. So the temperature must be only moderately hot and carefully controlled.

Shortcakes

Shortcakes are typically made of biscuit dough with more than the usual amount of fat--i.e., 1/2 cup of fat (instead of 4 to 6 tablespoons) to 3 cups of flour, 4 teaspoons of baking powder, 1 teaspoon of salt, usually a little sweetening, and milk enough to make a soft dough (about 1 cup of milk). For a two-layer shortcake, roll the dough to 1/4 inch thickness and bake one layer on top of the other, first buttering the lower layer so they will split apart easily. Spread the fruit--sweetened and crushed or sliced--over the bottom layer and also over the top. Whipped cream makes a nice finish.

For individual shortcakes, make the dough into large biscuits, and bake to a delicate brown. Break each biscuit open while hot, butter it, fill with fruit and spread fruit also over the top. Serve hot, and preferably with a finish of whipped cream. Drop biscuits also make attractive fruit shortcakes.

1. The first part of the paper is devoted to a general discussion of the problem.

2. In the second part we shall consider the case of a single particle.

3. The third part is devoted to the case of a system of particles.

4. In the fourth part we shall consider the case of a continuous medium.

5. The fifth part is devoted to the case of a system of continuous media.

6. In the sixth part we shall consider the case of a single continuous medium.

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